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LETTER DATED 22 JULY 1998 FROM THE HEAD OF THE GERMAN DELEGATION ADDRESSED TO THE SECRETARY-GENERAL OF THE AUTHORITY

Enclosed you will find a report on a training course organized and financed by the Carl-Duisberg-Gesellschaft and conducted by the Centre for Ocean and Climate Research of the University of Hamburg and the Raw Materials and Environmental Geology Faculty of the Free University Berlin from 1 April 1996 to 28 February 1997. The training course was initiated by Prof. Dr. Peter Halbach, then a member of the Training Panel of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea.

Since the Training Panel finished its work on 5 August 1994 and the Legal and Technical Commission met for the first time only on 27 March 1997, it was not possible to present the programme of the training course to the former body and to consult on the selection of the five participants. Because deep seabed mining will become a reality only in a more distant future, the scope of the training course was not restricted exclusively to deep seabed mining matters, but included also other subjects of ocean research and protection of the environment in order to allow participants to use the knowledge they had acquired immediately. The five participants received a certificate attesting to their completion of the training course.

I should be grateful if you would have the text of the present letter and the report on the training course circulated as an official document of the Legal and Technical Commission, which should take note of the report and take it into consideration in determining training obligations whenever a German enterprise submits an application for approval of a plan of work for exploration.

(Signed) Joachim KOCH
Chairman of the German delegation to
the International Seabed Authority

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Annex

FINAL REPORT ON THE TRAINING COURSE ON DEEP SEA RESOURCES AND DEEP SEA MINING

I. OUTLINE OF THE PROGRAMME OBJECTIVE

1. A training course was held for five stipendiaries of the Carl-Duisberg-Gesellschaft for the training panel of the United Nations set up in the context of the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea. The course provided specific theoretical and practical training on protection and use of oceans, marine geology, deep-sea mineral resources, their exploration and evaluation, possibilities to develop and process them, and environmental and legal aspects.

II. OUTLINE OF THE PROGRAMME AS IMPLEMENTED

2. The following courses and lectures were initially held in English, and subsequently in German as the ability of the participants to speak German improved.

Introduction to the course at the Centre for Ocean and Climate Research of the University of Hamburg, and excursion to the Baltic (1 to 19 April 1996)

3. This week-long trip was placed right at the beginning of the course. The concept and the timing were selected in view of the following aspects:

(a) The trip was intended to give the participants and the university staff an opportunity to get to know one another and for the staff to assess the strength and needs of the participants. For the university staff, it was particularly important to have an idea of the language skills (German, English), the specific abilities and wishes (particularly regarding the practical work) and the personal characteristics of the participants, as well as of where the participants stood in relation to one another. This made it easier during the rest of the course to recognize incipient problems at an early stage and to overcome them without great difficulty;

(b) As a relatively uniform geographical area, the Baltic Sea is a good illustrative model of a sea presenting specific characteristics and problems. Bordered as it is by many countries, the environmental protection of the Baltic Sea is a good example of the degree of complexity of such efforts, in terms both of the origins of pollution and of environmental policy. At the same time, decades of research have yielded readily available sets of data on the Baltic, and there also exists a series of treaties embodying a decades-long attempt to tackle the problems of this habitat at the international level (Helsinki Agreements Commission);

(c) The coast between Stralsund (eastern Mecklenburg-Western Pomerania) and Heiligenhafen (Schleswig-Holstein) reflects the development of small, relatively pristine fishing villages into highly developed tourism and bathing

centres - a development which is currently taking place in the participants' own countries as well. The situation of the coast under study clearly demonstrates both the positive and the negative consequences of such development;

(d) This part of the Baltic offers a good insight into the cultural history of northern Germany (Hanseatic cities) and the recent past, which can clearly be seen in the various landscape structures.

4. Dr. G. Arlt from the University of Rostock led the group to various sections of the coastline (Darss, Zingster Boddenkette) which present the characteristics of the coast of Mecklenburg-Western Pomerania particularly impressively and have been researched in depth by the University of Rostock for more than 70 years. This was a memorable experience for the participants, because the Baltic was still frozen over in the coastal area.

5. Dr. Wiemer and Dipl. Chem. Bachor from the State Office for Environmental Protection and Nature Conservation gave lectures presenting the operations and structure of water management in Germany and in Mecklenburg-Western Pomerania; it is a model of both the complexity and the efficiency of federal administration. The event was held in the German Museum for Oceanography in Stralsund. In the afternoon, the curator of the museum, Mr. Harder, showed the group around the museum's rich exhibits and the aquarium.

6. The Institute for Baltic Research in Warnemünde was represented in lectures by staff from all areas of specialization. In particular, mention was made of the level of international integration in Baltic research, which was initiated and promoted by the Helsinki agreements.

7. The tour around what is currently the most modern sewage works in Europe, located in Rostock (EURAWASSER Rostock) afforded the participants an opportunity to learn about the latest developments in sewage (bio)technology and to discuss all aspects of the issue of the regulated supply and disposal of drinking water and water for industrial use.

8. En route to Haffkrug, the group made numerous side excursions to special coastal formations and tours of the Hanseatic cities of Stralsund, Rostock, Wismar and Lübeck, and of the Minster Church in Bad Doberan. At Haffkrug, a slide show (presented by Mr. Fahrenholz) illustrated the transformation of a small fishing village (Haffkrug) in 1810 into a modern seaside resort today. This was followed by a lively debate on tourism development.

9. The trip ended with tours of the harbour, which is still used for part-time commercial fishing, and of the expanding tourism centre in Heiligenhafen, the final stage of the kind of development that is currently taking place around the world.

Lectures/courses

10. The following lectures and courses were given at Hamburg from 22 April to 5 July 1996:

(a) "Structure and genesis of ocean basins", lecture by Dr. A. Dehghani, Institute of Geophysics, University of Hamburg (22 April-3 May 1996);

(b) "Climate and oceans", lecture by Prof. Dr. Hoeber, Institute of Meteorology, University of Hamburg (6-17 May 1997);

(c) "Oceanography", lecture by Prof. Dr. Meincke, Institute of Oceanography, University of Hamburg (20-31 May 1996);

(d) Course BM1, "Oceanic geology", led by Dr. N. Blum, Dipl.-Geol. T. Kuhn, Free University Berlin (3-28 June 1996):

(i) Methods, equipment and global marine projects;

(ii) Plate tectonics (mid-ocean ridges, hot spots, trenches and arcs, backarc basins);

(iii) Structure and composition of the crust and upper mantle;

(iv) Ophiolites, alteration of ocean floor lithologies;

(v) Geochemical discrimination and petrogenesis;

(vi) Deep-sea sediments (distribution and components of marine sediments, sedimentation processes, sediment geochemistry);

(vii) Marine stratigraphy and palaeo-oceanography;

(e) Lectures by Dr. R. Koppelmann, Institute of Hydrobiology and Fishing Sciences, University of Hamburg:

(i) "Marine organisms and ecological systems of the oceans: plankton ecology";

(ii) "Introduction to and demonstration of methods of marine biology research" (seminar, 1-5 July 1996).

Lectures at the University of Hamburg (8-12 July 1996)

11. The following lectures were given at the University of Hamburg from 8 to 12 July 1996:

(a) "Introduction to biological oceanography", by Prof. Dr. Thiel, Centre for Ocean and Climate Research, University of Hamburg;

(b) "Ecology of mangrove swamps", by Prof. Dr. Saint Paul, Centre for Marine Tropical Ecology, University of Bremen;

(c) "Ecology of Wadden Seas", by Dipl. Biol. Claussen, Federal Environmental Agency, Berlin;

(d) "Ecology of the deep sea", by Prof. Dr. Thiel;

(e) "Ecology of coral reefs", by Dipl. Biol. Dr. Schriever, Hohenwestedt Research Institute.

Course on "Geochemistry of the lanthanides", led by Dr. M. Bau, Potsdam Georesearch Centre (15-19 July 1996)

12. Lectures with exercises were presented on the following topics: general chemistry of the lanthanides; rare earth elements (REE) in magmatic systems; REE in clastic sediments; REE in river and sea water and in chemical sediments; REE in hydrothermal systems; field and laboratory exercises: testing the river Havel to determine REE; REE enrichment with ion exchange (at the laboratory of the Potsdam Georesearch Centre); REE determination via inductively coupled plasma-mass spectrometry (ICP-MS) (at the laboratory of HMI Berlin).

Course BM3, "Marine mining techniques", led by Prof. Dr. H. Amann and Dipl. Ing. H. Öbius, Test Institute for Hydraulic Engineering and Shipbuilding, Berlin (22-26 July 1996)

13. The course covered the following topics: mining techniques: first- and second-generation devices; results of pilot tests in the laboratory and in the field; new mining devices and their applicability depending on water depth.

14. On 29 July 1996, the group visited the Alfred Wegener Institute for Polar and Marine Research in Bremerhaven.

15. On 30 July 1996, the group made an excursion to Cuxhaven and took a tour of the fisheries research vessel Meerkatze; and attended lectures on the organization of fisheries protection and the coast guard.

16. Seminars in the Federal Board of Maritime and Hydrographical Agency (1-2 and 9 August 1996) were held on the following topics:

(a) The application of numerical models in hydrographic services (prediction of water levels, oil spill management, environmental impact assessment) and in the investigation of environmental problems;

(b) The use of satellite-transmitted data (NOAA, ERS-1) in North Sea surface temperature mapping and the production of ice covering maps by the ice prediction service;

(c) Monitoring of pollutants in the marine environment: strategy and results.

17. Other training courses held were:

(a) Seminar of the Carl-Duisberg-Gesellschaft (organizer of the training course) (5-8 August 1996);

(b) Visit to the oil identification laboratory of the Federal Maritime and Hydrographical Agency in Sülldorf (9 August 1996);

(c) Training course on "Systems management" (12-17 August 1996);

(d) Training course on environmental impact assessment (19-24 August 1996). One important aspect of the course was to impart to the participants not merely the scientific basis for marine environmental protection, but also an understanding of why such protection is needed and how it can be implemented both administratively and in practice. Participants were given presentations on the design and development of environmental impact assessments in the context of planning procedures using both theoretical models and specific case-studies, and were given the opportunity to practice these skills. During this exercise, various related problems existing in the participants' own countries were raised and discussed. The course was subdivided as follows:

(i) "Environmental assessment of sand mining, cable and pipeline building in near-shore waters". All-day seminars with exercises, presented by Dr. K. Figge, Federal Maritime and Hydrographical Agency. Environmental impact assessments were drawn up on the three model projects in small working groups (19-21 August);

(ii) "Introduction to environmental assessment studies - what are the differences in the different countries?", presented by Dr. I. Kronberg and Dr. G. Schriever, Hohenwestedt (22-24 August).

18. From 26 August to 6 September 1996 an excursion was conducted to the Netherlands, Belgium and the United Kingdom. The trip was intended to give participants a broader picture of: (a) two major European marine research centres, (b) international organizations in Europe and (c) other cities and countries of Europe.

19. The lectures at the Netherlands Instituut voor Onderzoek of de Zee (NIOZ) covered the problems of the global overexploitation of living marine resources (overfishing, destruction of stocks and natural regeneration as a result of the destruction of recruitment waters, etc.). A one-day trip on the NIOZ research vessel Navicula led by Dr. Mark Fonds provided a practical illustration of this topic.

20. In London, the group visited the International Maritime Organization (IMO). Dr. Nauke and members of the staff of the organization reported on the opportunities for developing countries to share in international research projects and funding support. Each participant was given a large amount of informative material and contact addresses.

21. A detailed city tour with a visit to the Docklands, to the Thames flood barrier and the Greenwich Observatory rounded off the trip to London. On the way to Southampton, the palace and gardens of Hampton Court were visited.

22. In Southampton, the group visited the Southampton Oceanographic Centre (SOC), one of the largest and most modern marine research centres in the world. In addition to talks on current projects and on the results of deep-sea and experimental research, particular attention was paid to SOC's pool of instruments, which can be leased by marine researchers throughout the world.

23. In Brussels, the possibilities for non-European researchers to obtain European funding were presented and discussed in the central administration of the European Union. Once again, a large amount of documentation was distributed.

Excursion, 11-21 September 1996

24. The following excursion was taken by the stipendiaries A. J. Gunatilaka, V. Amarasingha and Dani Hamdani, with excursion leaders Dr. E. Rahders and Dr. B. Pracejus, of the Free University Berlin. The topics were: applied geology, viewing of deposits in Lower Saxony and Bavaria; lignite in Hemstedt; salt domes, including final storage; landfill and waste management of the Preussag steel mill; steel production; Harz waterworks/dams; Oberharz pit water flow; Ruhme spring on the edge of the Harz mountains; baryte veins in the Spessart; microbiological soil decontamination at Neu-Isenburg; graphite pit at Kropfmühl; Bayerischer Pfahl (large quartz vein in Bavaria); Schott glassworks at Zwiesel; Bodenmais silver mine (massive sulphides); Reichart shaft (fluorite); Theuern museum; kaolin deposits; continental deep drilling at Windischeschenbach; hydrothermal deposits in the Eger trough; Soos.

Research trip, 11-29 September 1996

25. The following research trip on the research vessel Le Suroit was arranged for the stipendiaries Yanto Sudiyanto and Mohammed Zaidan, under the scientific leader Prof. Dr. P. Halbach, of the Free University Berlin: flight from Berlin to Toulon, France; transit by boat to Urania Basin, west of Crete; use of Hydro Bottom Station (HBS) and collection of water and sediment samples; transit to Palinuro Seamount west of Naples; use of HBS, sample collection. Introduction to the nautical principles and scientific equipment of a research vessel.

Course, 23-27 September 1996

26. Course BM4, entitled "Deep-sea resources and their origin", an ore microscopy course presented to the stipendiaries A. J. Gunatilaka, V. Amarasingha and Dani Hamdani, by the lecturer Dipl. Geol. L. Beggerow, covered the following areas: the microscope and its functions; diagnostic characteristics of polished ore minerals; the main ore minerals and their diagnostic characteristics; important parageneses.

Berlin programme, 6-14 October 1996

27. The programme consisted of the following: tour of the Institute for Geology, individual demonstrations of instruments (AAS, ICP, Raster Electron Microscope); introduction to recent history of Berlin and its inhabitants and the German constitution; lectures by the scientific project leaders: hydrothermalism in the Aegean; harbour silt/environmental problems in German port cities; research into hydrothermal flows in the North Fiji Basin; young ore deposits in the North Fiji Basin; "Tusch": deep-sea and environmental protection; hydrothermal ores in the Okinawa trough; principles of submarine hydrothermalism and the creation of massive sulphide ores; concluding discussion. Tour of the Museum of Transport and Technology (special department for marine history) and the Museum of Natural History by Dipl. Geol. A. Hübner;

tour of the Potsdam Georesearch Centre with lectures on the tasks and individual research projects of the Georesearch Centre and the Alfred Wegener Institute for Polar and Marine Research. Tour of the Test Institute for Hydraulic Engineering and Shipbuilding.

Excursion, 15-18 October 1996

28. Excursion F4, led by Dipl. Geol. T. Kuhn, visited: Elbe sandstone mountains; Ehrenfriedersdorf and Annaberg-Buchholz mines; visit of the Mining and Geology Museums in Ehrenfriedersdorf and Freiberg; Tharandter Forest; Meissen and environs; Dresden and environs.

29. The following courses and excursions were held in Hamburg:

21-24 October 1996

(a) The responsibilities and the work of the International Oceanographic Commission (IOC), Dr. A. Talkatchev, IOC, Paris;

(b) How to handle EU proposals - which aspects are essential?, Dr. G. Schriever;

(c) The use of the deep sea - the deep sea projects DOMES and MESEDA, Prof. Dr. H. Thieland, Dr. G. Schriever;

(d) The German large-scale project DISCOL - Deep sea mining and protection of the marine environment;

(e) 28 October-8 November 1996. Course BM2, entitled "Marine geophysical exploration methods and techniques", headed by J. Post and H. Sulzbacher of Hydromod, Hanover, covered the following: principle marine geophysical methods and techniques (modern navigation and positioning systems, acoustic methods), mapping of magnetic anomalies (principles of magnetic measurement, mapping of magnetic anomalies in the ocean); mapping of gravity anomalies (principles of gravity measurements, mapping of gravity anomalies in the ocean); exercises on the mapping of marine magnetic and gravity anomalies; digital documents; exploration strategies for different marine deposits with respect to geophysical methods (oil and gas deposits, hydrothermal ore deposits, manganese nodules, phosphorite nodules, metal-rich crusts, placer deposits); environmental aspects of marine geophysical methods (exploration phase, mining phase); measurement of heat flow anomalies (principles of heat flow measurements, mapping of heat flow anomalies in the ocean); exercises on the mapping of marine heat flow anomalies; current measurements-transport processes in the ocean (principles of current measurements, current measurements for different applications); exercises on the mapping of marine currents transport pattern;

(f) 11-15 November 1996. Course BM4, entitled "Deep-sea resources and their origin", led by Dr. J. Hein, United States Geological Survey, California, covering: phosphogenesis in the ocean; seamount deposits; structure of the continental margin and the adjacent ocean and respective mineral deposits; compositional regions of the Pacific Ocean; abyssal nodules; sources of metals in nodules;

(g) 18-22 November 1996. Course BM4, entitled "Deep-sea resources and their origin", led by Dr. A. Koschinsky, Free University Berlin, covering: geochemistry of marine ferromanganese crusts and nodules (formation and chemical composition of manganese nodules, differentiation between hydrogenetic and diagnetic precipitates, geochemical methods for the investigation and genetic interpretation of crusts and nodules); the Midpac project; ferromanganese crusts (crust occurrences in the central Pacific, genetic interpretation); SO 83, ferromanganese precipitates in the north-east Atlantic (general investigations, comparison with Pacific crusts, composition of crusts as palaeo-indicators for events in the north-east Atlantic); sequential leaching experiments and genetic interpretation; "Tusch": deep-sea environmental protection; geology of marine iron and manganese deposits, phosphorites and placers;

(h) 25-29 November 1996. Course BM4, entitled "Deep-sea resources and their origin", led by Prof. Dr. P. Halbach and Dr. B. Pracejus, Free University Berlin, covering: deep-sea hydrothermal mineralizations (volcanogenic massive sulphide ((VMS) deposits, black-and-white smokers, mounds, source rocks); vent fluid studies; tectonic situation (divergent plate boundaries, mid-oceanic ridges, volcanic island arcs, hot spot systems); hydrothermal circulation (heat flow, permeability, seawater/rock reactions and ratio); fast and slow spreading ridge; backarc centres; ancient and modern equivalents (Jade field, Okinawa trough, North Fiji Basin, MESO Zone, Indian Ocean, Kuroko type, Cyprus type); platinum concentration in ferromanganese seamount crusts; carbonate dissolution rate and composition of Co-rich ferromanganese crusts; heavy metal distribution in Pacific ferromanganese nodules and crusts;

(i) 2-6 December 1996. Course BM4, entitled "Deep-sea resources and their origin", led by Dr. Müller, Dr. Reichert, Dr. Neben, Dr. Fritsch, Dr. Roeser, B. Schreckenberger, G. Wissmann, Dr. Meyer, H. Keppler, Dr. Kudrass, Dr. Ranke, Dr. v. Stackelberg, Dr. Riech, Prof. Beiersdorf, Dr. v. Rad, Dr. Weber, Dr. Marchig, Dr. Wiedicke, Federal Institute for Geosciences, Hanover. Topics covered: tasks of the Federal Institute for Geosciences; presentation of the maritime geophysical instruments of the Institute; seismic processing at the Institute; heavy minerals; phosphorites; marine geological equipment; manganese diagenesis; manganese nodules in the Peru Basin;

(j) 9-13 December 1996. Course BM8, entitled "International legislation, law of the sea, deep-sea mining regulations", led by Mr. Koch, Federal Ministry of Economics, Bonn, covering: historical review of the formation of the United Nations Convention on the Law of the Sea of 10 December 1982; events leading up to the Third United Nations Conference on the Law of the Sea; events during the Conference; comparison of disputed provisions; establishment of the organs of the International Seabed Authority; tasks of the organization; conclusion of agreements with the registered pioneer investors; conclusion of agreements with the potential applicants; monitoring of adherence to commitments assumed by the pioneer investors;

(k) 16-20 December 1996. Course BM3, entitled "Marine mining techniques", led by Prof. Dr. H. Wolff, Technical University, Berlin, covering: mining techniques (first and second generation) as a function of water depth; results of pre-pilot tests and pilot mining operations in the sea; comparative economy of shallow-water and deep-sea mining ventures; manganese nodule mining industry;

a study of expected instrument requirements; future outlook for nodule industry; comparative economics of recovery of metals from ocean nodule deposits;

(l) 6-10 January 1997. Course BM5, entitled "Processing of marine minerals", led by Prof. Dr. H. Wolff, Technical University, Berlin, covering: different types of physical, physico-chemical (metallurgical) and chemical (hydrometallurgical) beneficiation processes; technical methods and their chances of realization; evaluation of mass fluxes and products; economic characterization;

(m) 13-17 January 1997. Course BM6, entitled "Marine research techniques", led by Dipl. Ing. G. Abich, RF Bremen, covering: modern research vessels; operation, maintenance and logistic support of research vessels and ship-borne scientific systems; cost of research cruises; research techniques and necessary equipment; data processing and analytical methods; sampling and surveying techniques; fibre-optic data telemetry for deep-sea research;

(n) 21-22 January 1997. Course BM7, entitled "The oceanic environment under the influence of mining", led by Prof. Dr. J. Schneider, University of Göttingen, covering: minimizing mining effects; bottom impacts; impacts on the bottom near water layer; impacts on the oceanic water column; impacts on the atmosphere; impacts on the terrestrial environment; problems of processing of tailing storage;

(o) 27-31 January 1997. Excursion F6-Berlin and environs with introductory talks, led by Dipl. Geol. U. Jochmann, Free University Berlin: sandstone quarry (sand and mortar works) at Niederlehne; local geology of south-west Berlin; dune formation in and around Berlin; limestone quarry at Rüdersdorf with processing and industrial use; geology of building land in and around Berlin, hydrogeology, groundwater management;

(p) 3-7 February 1997. Excursion F5-Introduction to the geology of Mecklenburg-Western Pomerania with lectures, led by Dipl. Geol. S. Richter, Greifswald University, covering: Hanseatic City of Greifswald; Institute of Geological Sciences, key research areas and facilities; excursion to Usedom island, dynamic coastal processes; Warnemünde Institute for Baltic Research, tasks and facilities of the Institute; tour of the research vessel Humboldt; Rügen island, chalk deposits, Quaternary glaciation, weathering from frost; oil drilling near Greifswald, Museum of Oil/Gas;

(q) 10-11 February 1997. Course on the tasks of the Marine Science and Technology (MAST) programme of the European Union, led by Dipl. Geol. M. Maggiulli, Free University Berlin: presentation of completed and current projects of the Free University in the context of MAST;

(r) 13 February 1997. Course on "Hydrothermal bacteria and the evolution of life", led by Dipl. Biochem T. Dakkak, Free University Berlin;

(s) 14 February 1997. Tour of Deutsche Welle TV, introduction to the German media system, by S. Stöber;

(t) 18 February 1997. Course on the geology of the eastern Mediterranean and the Alps, led by Dr. E. Manuzoglu, Free University Berlin.

30. On 20 February 1997, a research trip was conducted on the research vessel Alkor, organized by Geomar, Kiel, and led by Dr. Linke. The trip focused on the introduction to the functions and potential uses of geological measurement and sampling equipment.

III. INSTRUMENTS AND METHODS USED

31. In addition to the lectures, stipendiaries participated in exercises to familiarize them with modern geochemical and geophysical analytical equipment. Two trips on the French research vessel Le Suroit, and the German research vessel Alkor, acquainted them with the operation of marine geology research trips.

IV. COMMENTS ON THE QUALIFICATIONS OF THE PARTICIPANTS

32. All the participants were adequately qualified for the course. The level of interest in the lectures, exercises and excursions was very high. Apart from extremely rare absences, which were attributable to illness and were excused, they attended all events.

V. RESULTS ACHIEVED

33. The objective of the course was fully achieved. The stipendiaries now have detailed knowledge of marine resources, their genesis, availability and evaluation. They are also thoroughly familiar with the geochemical and geophysical principles needed for exploration and exploitation of such deposits. The environmental and legal aspects were also considered in detail.

34. It should be emphasized that there were many discussions, often outside actual teaching hours, in which open questions were clarified and knowledge was deepened. The good personal relations between the stipendiaries and the specialist scientists greatly facilitated this communication. The stipendiaries visited the leading marine and geological institutions in Germany, were informed about their tasks and objectives and have established specialist and personal contacts with many scientists and staff workers.

VI. CONCLUSIONS

35. The fact that five stipendiaries participated in the course which we organized proved to be very positive. The introduction to the scientific instruments and the many discussions during the frequent exercises and seminars and on the excursions and research trips showed that it is very important to respond to the stipendiaries individually; in our view, therefore, the number of participants should not be substantially higher.

36. Another positive factor, and one which might be stressed still further, was the occasional attendance of courses at other institutions (e.g. Hamburg, Hanover, Rostock), organized both by us and by other organizations.

37. It is important that the stipendiaries be taught both by academics from the research sector and by individuals from the business/commercial sector.

38. Holding the course at a university, where the stipendiaries also have an opportunity to attend lectures and exercises given as part of normal university courses, facilitates the integration of the stipendiaries with the teaching staff and fosters communication outside the area of specialization as well.

Appendix

LIST OF PARTICIPANTS IN THE CARL-DUISBERG-GESELLSCHAFT TRAINING COURSE ON DEEP-SEA MINING

Participant	Country	Degree/specialization
A. J. Gunatilaka	Sri Lanka	M.Sc., Geologist
V. Amarasingha	Sri Lanka	B.Sc., Engineering teaching associate
Yanto Sudiyanto	Indonesia	B.Sc., Geologist
Dani Hamdani	Indonesia	B.Sc., Mining engineer
Mohammed Zaidan	Indonesia	B.Sc., Mining engineer